



NOTES ON FIRST VERSION OF CP/M PLUS ON INTERAK

# Make Backup copies of CPM Plus

Master :-

- ① ~~FORMAT (a blank disk) (on DRIVE B, SKEW2)~~
- ② ~~GENLDR ( is same as SYSGEN previous )  
( ON TO DRIVE B )~~
- ③ ~~PIP A: = B: CPM3.SYS [OVR]~~  
or  
~~PIP B: = A: CPM3.SYS [OVR]~~  
FILE IS COPIED FROM DRIVE A ONTO DRIVE B
- ④ ~~or PIP A: = B: \*.\* [OVR]~~  
or  
~~PIP B: = A: \*.\* [OVR]~~  
ALL FILES ARE COPIED FROM A ONTO B.

if you do step ④ you don't need to do step ③

DM

22/12/86

# INTERAK CP/M PLUS

## USER MANUAL

(C) K. J. Daley

Version 0.1

**Draft Only!**  
(This contains some details  
which are different from the  
Interak CP/M Plus currently  
supplied. Revised manual  
to be issued in due course)

1

(see also pages 1a)  
and 1b)

22-12-86

# Notes to accompany first-release disk.

This needs some more work doing on it, but is supplied so that you have a sample of what is to come. Please contact us in a few weeks time to find out the procedure for obtaining an upgrade.

The disk supplied does have its own unique serial number, so you can send off the registration card now. (As part of our licence agreement with Digital Research we have to tell them the name and serial number for each CP/M Plus supplied.)

Set switches on FDC-1 card as follows (this information supercedes instructions in FDC-1 Manual):

The switch details are as follows:-

Switch	Function	Off (=1)	On (=0)
S1h	vdu	serial	VDU-2K
S1g	keyboard	serial	LKP-1

The switches are read once only during a Cold Start. Any combination can be used, which opens the door to the use of a serial keyboard with VDU-2K if required.

The chosen options are displayed within the logo at sign-on to confirm the selection.

## General:

Since the BIOS module now contains the console routines, we have changed its name from BIOSKRNL to BIOS. Also, I have changed the name of DRIVE.ASM to CONFIG.ASM so that it can be used for all configurable parameters, not just drive parameters. Hence, if changes are made to the CONFIG.ASM file, the generation process is now:-

RMAC CONFIG

LINK BIOS3[OS]=BIOS, CONFIG

One additional benefit that springs from having no separate console files to link is that CPMLDR does not have to be reconfigured every time you change the console type.

## Note on Printer Ports: -

In this implementation the Printer Ports are  $\phi 2_H$ ,  $\phi 3_H$  for status and data respectively. Some users, and most existing tape based software, expects  $\phi 6_H$ ,  $\phi 7_H$ , so the present implementation will not be convenient. We are working on this problem.

## Chess:

Supplied disk also includes CHESS643 - not part of CP/M, but from Interaction User Group - needs VDU-2K with "CGV0208" character generator EPROM to work.

## CONTENTS

1	SPECIFICATION FOR INTERAK CP/M PLUS .....	5
1.1	Microprocessor .....	5
1.2	Memory .....	5
1.3	Floppy Disk Controller .....	5
1.4	Console .....	5
1.5	Printer .....	6
1.6	Drive Formats .....	6
2	FIRST STEPS .....	7
2.1	Overview .....	7
2.2	File References .....	7
2.3	Cold Start .....	8
2.4	Help .....	8
2.5	Hardcopy .....	8
3	INVENTORY .....	10
4	COMMAND INSTRUCTIONS FOR GREENBANK UTILITIES ..	
4.1	Format	
4.2	Gen1dr	
4.3	Solo	
5	CONSOLE CONFIGURATION .....	
6	FURTHER INFORMATION .....	

The flexibility built in to Interak CP/M Plus means that it can be altered to run on any Interak system within the constraints of the following specification:-

### 1.1 MICROPROCESSOR

The system processor must be a Z80 or code-compatible device.

### 1.2 MEMORY

At least 32K of contiguous RAM must be available starting at 0000H.

### 1.3 FLOPPY DISK CONTROLLER

The system must utilise the FDC-1 Floppy Disk Controller Board addressed as recommended by Greenbank Electronics in the FDC-1 data sheet.

### 1.4 CONSOLE

Either a serial or memory-mapped visual display unit, together with a serial or parallel keyboard may be used, configuration being achieved by setting 2 dip switches on the FDC-1 board.

The serial vdu and/or serial keyboard must be addressed with the status and data ports as 00H and 01H respectively.

The memory-mapped vdu must be 64 columns by at least 24 lines, with a start address of F000H (eg VDU-2K)

The parallel keyboard must be addressed as 40H, bit 7 being the positive strobe bit. (eg LKP-1)

### 1.5 PRINTER

The operating system will support a serial listing device, addressed with the status port as 02H and the data port as 03H.

## 1.6 DRIVE FORMAT

The System drive (A) must always have the following standard format:-

- Double-sided
- Double density
- 512 bytes per sector
- 20 sectors per track
- 80 tracks per disk
- 2 reserved tracks
- 256 directory entries
- 4k block size

The other drives (B, C, and D) are similarly supplied, but they can be reconfigured to any other format. This process is explained in The Interak CP/M Plus Technical Manual.

## 2.1 OVERVIEW

CP/M denotes Control Program for Microcomputers. CP/M Version 3.0 (known as CP/M Plus) is the latest in a series of enhancements to the original 8 bit CP/M operating system.

CP/M is a single-console operating system, supporting up to sixteen users, and providing an environment for program construction, storage, editing, and execution.

The operating system itself is made up of three distinct modules; the Basic Disk Operating System (BDOS), the Basic Input/Output System (BIOS), and the Console Command Processor (CCP). The function of each module is discussed more fully in The Interak CP/M Plus Technical Manual.

CP/M executes most commands by loading the appropriate file from disk into an area of memory called the Transient Program Area. These files are known as Transient Commands. A few commands are built into the operating system and are consequently known as Built-in Commands.

Reference is made throughout this manual to the System Tracks and System Disks. Any disk designed to run in drive A has two reserved tracks (in the case of Interak) which contain the necessary loaders and the Console Command Processor. Such a disk is referred to as a System Disk, and its first two tracks are referred to as the System Tracks.

## 2.2 FILE REFERENCES

CP/M provides rapid access to data through a comprehensive file management sub-system. A file reference consists of a filename and an optional filetype, separated by a full-stop, eg:

DIR.COM            LETTER.1            SHOPPING.LST

A filename may be up to eight characters long, and a filetype up to three characters long but neither must contain any of the following special characters:

< > [ ] ( ) / \ ! . , ; : = ? \* - %

All alphanumerics and the remaining special characters are allowed.

Filetypes are somewhat arbitrary, but in many cases software is dependant on certain filetypes for correct operation. For example, command files must have a filetype COM.

Ambiguous file references may be used to access batches of files with partly common filenames or filetypes. Wildcards are used for this purpose, the "?" replaces single characters and the "\*" replaces multiple characters.

## 2.3 COLD START

When you switch on your Interak or operate the reset switch, only the system monitor is active. To load CP/M Plus, a System Disk must be present in drive A and the Boot (B) command must be entered from the keyboard.

The sign-on display gives the following information about the current configuration of the system:

- the start address and size of the BIOS.
- the start address and size of the BDOS.
- the amount of free memory space available for transient program use.
- the BIOS version number.
- the selected type of vdu and keyboard, displayed within the logo.

If all is well, the Console Command Processor is loaded and the system prompt 'A)' is displayed. 'A' signifies the current default drive. This is your invitation to enter a command.

## 2.4 HELP

One of the best features of CP/M Plus compared to its predecessors is the Help Utility. Detailed guidance on invoking most commands on the distribution disk is available by typing:

HELP <CR>

at the system prompt. This is the ideal first command, and liberal use should be made of it until familiarity is gained.

## 2.5 HARDCOPY

If you have a printer connected to your Interak, and you want a hardcopy of what transpires on the vdu, enter <CTRL-P> at any time during the input of a command. The same action will disable the hardcopy output if repeated.

This section is an introduction to each file on the distribution disk. No attempt has been made to duplicate the detailed information available within the Help Utility, so reference should be made to the latter before commands are invoked.

Files annotated with (DR) are written by Digital Research, designed for use on any machine which supports CP/M Plus. Those annotated with (GB) are written for Greenbank Electronics by K. J. Daley specifically for the Interak 1 computer.

Files annotated with (R) are, as far as this implementation is concerned, redundant utility files provided by Digital Research to aid the creation of the system software. They were not used in the creation of Interak CP/M Plus but are provided in case anyone wishes to refer to them or produce their own system software.

### BDOS3.SPR (DR)

A relocatable system file containing the BDOS for a non-banked system. It is combined with BIOS3.SPR by GENCPM.COM to produce CPM3.SYS.

### BIOSKRNL.ASM (DR, R)

Provided as a model for the creation of the BIOS.

### BIOS.REL (GB)

This is the Interak Kernel BIOS in relocatable form. It is linked to CONFIG.REL to produce BIOS3.SPR which is the complete BIOS.

### BIOS3.SPR (GB)

Created by linking BIOS.REL and CONFIG.REL, this file is combined with BDOS3.SPR by GENCPM.COM to create the complete CP/M Plus System file CPM3.SYS.

### BNKBDOS3.SPR (DR, R)

A relocatable system file containing the BDOS for a banked system. It is combined with RESBDOS3.SPR and BNKBIOS3.SPR by GENCPM.COM to produce CPM3.SYS.

### BOOT.ASM (DR, R)

Provided as a model for the creation of the Cold Boot Loader.

### CALLVERS.ASM (DR)

An example assembly file aimed at programmers.

### CBLDR.PRG (GB)

The Cold Boot Loader. Resides in the first sector of the first track of System Disks. Loads and executes the CP/M Loader.

### CCP.COM (DR)

The Console Command Processor loaded by the operating system at every Warm Start. It usually resides on the

System Tracks of any disk which needs to run in drive A. It is written to the System Tracks by GENLDR.COM. CCP.COM must be present on the disk in drive A during warm starts. If it is not present, the message, "Insert System Disk in drive A", is given.

#### CHARIO.ASM (DR, R)

Provided as a model for the creation of a part of the BIOS which handles character input and output.

## CONFIG.ASM (GB)

Assembly file of configuration tables used to customise an Interak system to precise needs, mainly with regard to drive formats.

## CONFIG.REL (GB)

Relocatable module derived from CONFIG.ASM by RMAC.COM. This module is linked to the BIOS.REL file to create the complete BIOS.

## COPYSYS.ASM (DR, R)

Intended as the basis for a utility which would copy the system loaders to the System Track. It has not been used in the Interak 1 implementation. A utility called GENLDR.COM has been created for this purpose.

## CPM3.LIB (DR, R)

A library of routines which aid the generation of various software tables during the creation of the BIOS.

## CPM3.SYS (GB)

This is the file which contains the operating system itself, residing in the data area of all System Disks. It is produced by GENCPM.COM which brings together the BDOS and BIOS.

## CPMLDR.REL (DR)

Linked with LDRBIOS.REL and CONFIG.REL to create CPMLDR.COM.

## CPMLDR.COM (GB)

The CP/M loader. This command file is produced by linking CPMLDR.REL with LDRBIOS.REL and CONFIG.REL, and its sole task is to load CPM3.SYS from the System Tracks into memory at every Cold Start. It is written to the System Tracks by GENLDR.COM.

#### DATE.COM (DR)

Sets or displays the date used for date-stamping the directory entries (optional).

#### DEVICE.COM (DR)

Utility for displaying and altering the physical to logical device assignment and the attributes of peripheral devices. Not yet implemented in the Interak BIOS.

#### DIR.COM (DR)

Displays the names and conditionally the attributes of files on any specified drive.

#### DIRLBL.RSX (DR)

Extension to the BDOS used with DIR.COM by the operating system.

#### DRVVTBL.ASM (DR, R)

Example drive parameter tables for BIOS construction.

#### DUMP.ASM (DR)

Assembly file of DUMP.COM intended as an example of file handling source code.

#### DUMP.COM (DR)

File dump utility which displays the hexadecimal data content of a file in tabular form.

#### ECHOVERS.ASM (DR)

An example assembly file aimed at programmers.

#### ED.COM (DR)

Digital Research's simple (?) text editor.

ERASE.COM (DR)

Deletes files. Use with care!

FD1797SD.ASM (DR, R)

Example Floppy Disk Controller routines for BIOS creation.

FORMAT.COM (GB)

Initialises unused floppy disks for use on the Interak system. Reads the necessary format from the configuration of the specified drive. Only the drive and the desired Skew Factor (normally 2) need to be specified. Verification of successful formatting is performed after each track is initialised.

GENCOM.COM (DR)

Creates special COM files with attached system extensions. Aimed at programmers.

GENCPM.COM (DR)

Combines the BDOS and BIOS after a question and answer session to create the CP/M system file CPM3.SYS. The screen size and memory availability can be changed with this utility. The memory ceiling is set at EFFFH on the Distribution Disk. The top page (F000H) can be reclaimed if a serial vdu is being used.

GENLDR.COM (GB)

Writes the Cold Boot Loader, the CP/M loader, the logo, and the Console Command Processor to the System Tracks of the specified disk. All disks intended to run in drive A should have these files on the System Tracks.

GET.COM (DR)

Directs the system to take console input from a disk file instead of the keyboard.

HELP.COM (DR)

Detailed operational instructions for the (DR) command files on the distribution disk.

HELP.HLP (DR)

Text file for HELP.COM.

HEXCOM.COM (DR)

Generates a COM file from a HEX file. Used to be called LOAD.COM in earlier versions of CP/M.

HIST.UTL (DR)

Generates histogram of execution frequency of program segments when utilised under SID.COM.

INITDIR.COM (DR)

Initialises the directory area to enable date stamping of files. Date stamping is optional.

LIB.COM (DR)

Supplied for programmers, manages libraries of object modules for inclusion during program assembly.

LINK.COM (DR)

Links relocatable object files to create command files for execution.

MAC.COM (DR)

Macro Assembler. Assembles 8080 source code files into relocatable object files.

MODEBAUD.LIB (DR, R)

Example table for software controlled input/output.

MOVE.ASM (DR, R)

Example BIOS routines mainly for banked memory.

PATCH.COM (DR)

Used for installing software patches to the system or command files.

PIP.COM (DR)

Peripheral Interchange Program. Used for copying data to/from files or devices.

POR.TS.LIB (DR, R)

Example port table for BIOS creation.

PUT.COM (DR)

Diverts console or printer output to a file.

RANDOM.ASM (DR)

Example assembly file demonstrating random access to file records.

RENAME.COM (DR)

Changes the name of a file or files.

RESBDOS.SPR (DR, R)

Part of BDOS for banked-memory systems.

RESBDOS3.SPR (DR, R)

Part of BDOS for banked-memory systems.

RMAC.COM (DR)

Relocatable Macro assembler.

SAVE.COM (DR)

Copies the contents of memory to a file.

SCR.ASM (DR, R)

System Control Block used by the operating system but also available for use by the BIOS.

SET.COM (DR)

Sets certain attributes of files.

SETDEF.COM (DR)

Defines disk order for program search, and console display modes.

SHOW.COM (DR)

Displays drive characteristics, including disk free space.

SID.COM (DR)

Program debugger for 8080 code.

SOLO.COM (GB)

Utility for copying files between disks when only one drive is available.

SUBMIT.COM (DR)

Allows the execution of a batch of commands previously entered into a SUB file. If a file called PROFILE.SUB is created, the contents will be executed at Cold Start without console intervention.

TRACE.UTL (DR)

Utility used with SID.COM for controlled program execution and trace.

TYPE.COM (DR)

Displays the contents of an ASCII file.

XREF.COM (DR)

Provides a cross-reference of variables between relocatable modules after linking.

Z80.LIB (DR)

Extends the RMAC assembler to use some Z80 mnemonics.

# 4 COMMAND INSTRUCTIONS FOR GREENBANK UTILITIES

The following pages contain detailed instructions for the execution under CP/M Plus of programs specifically written for Interak.

#### 4.1 FORMAT.COM

This utility initialises floppy disks with the current format of the specified drive.

Input: FORMAT <CR>

Response: FORMAT VX.X FOR INTERAK CP/M PLUS (C) K. J. Daley

Type <CTRL-C> at any time to abort

Which drive?

Input: A B C or D

Response: Skew Factor? [1-9]

Input: 1 to 9 (normally 2)

Response: Ensure the selected drive contains the disk to be formatted!

Type <CR> to begin

Input: <CR>

Response: 00 (incrementing track number)

Change disk and type <F> to repeat, or type <CR> to finish

## 4.2 GENLDR.COM

Four system files must be present on the default drive:

CBLDR.PRG CPMLDR.COM LOGO.DAT CCP.COM

Input: GENLDR

Response: GENLDR VX.X FOR INTERAK CP/M PLUS (C) K. J. Daley

(Warning and termination here if any of the four files are missing)

Change disk now if writing to default drive

Destination drive? [A to D, or <CR> to abort]

Input: A B C D or <CR>

Response: Write verified ('Write not verified' if errors occur)

Change disk and type <G> to repeat, or type <CR> to finish

Input: G or <CR>

#### 4.3 SOLO.COM

Input: SOLO

Response: SOLO UX.X FOR INTERAK CP/M PLUS (C) K. J. Daley

Solo drive facility now in operation.

Solo, the transient program for solo-drive operation, is on this disk. Once invoked, it remains in operation until the next Cold Start. Any format can be used on logical drive B, by configuring the CONFIG.ASM file and regenerating the system as usual.

CONFIDENTIAL

## FURTHER INFORMATION

The aim of this manual is to provide users of Interak CP/M Plus with enough information to run existing software. For users who wish to write their own software, Greenbank Electronics can supply appropriate programming manuals by Digital Research.

For users who need to alter the configuration of the disk drives, or who require more technical information, the Interak CP/M Plus Technical Manual is available.